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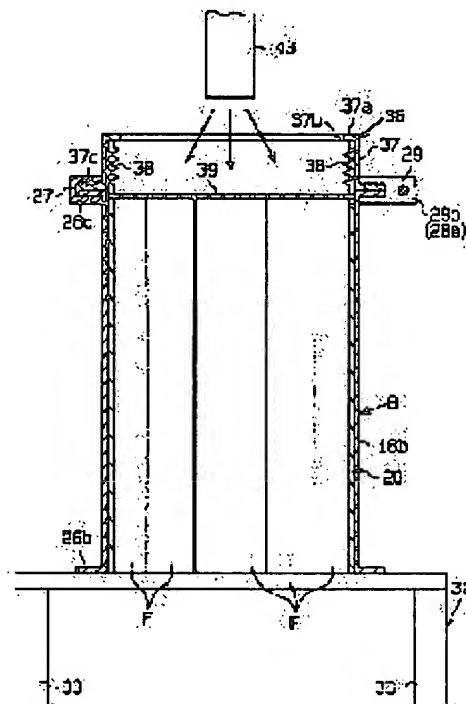
(72)Inventor : KOJIMA MASAOKI

(54) METHOD FOR REMOVING RESIDUE ON FILTER FOR EXHAUST EMISSION CONTROL DEVICE, DEVICE FOR REMOVING THE SAME, AND THE FILTER FOR EMISSION CONTROL DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To remove combustion residues adhered to a filter nearly perfectly.

SOLUTION: A nozzle 43 is disposed above a filter. Cleaning water as a high-pressure liquid is sprayed from the nozzle 43 to one end of the filter. As a result, combustion residues such as ash and the like generated and adhered to the filter after combustion of particulate matters can be removed nearly perfectly.



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CLAIMS

[Claim(s)]

[Claim 1] The survival removal method of the filter for exhaust-air gas-cleanup equipments which washed in the combustion survival which carried out the uptake of the particulate discharged from an internal combustion engine, is the filter which carries out combustion removal, sprayed [was held in casing prepared on the exhaust-air passage of an internal combustion engine,] a high-pressure fluid on the end of the aforementioned filter in the survival removal method of removing the combustion survival deposited on this filter by the repeat of the combustion, and has adhered to the aforementioned filter.

[Claim 2] The aforementioned filter is the survival removal method of the filter for exhaust air gas cleanup equipments according to claim 1 characterized by protecting a part for jointing of the aforementioned honeycomb sintered compacts when pasting up those peripheral faces with adhesives using two or more honeycomb sintered compacts and spraying a high-pressure fluid on the end of the aforementioned filter.

[Claim 3] The aforementioned high-pressure fluid is the survival removal method of the filter for exhaust air gas cleanup equipments according to claim 1 or 2 characterized by being water.

[Claim 4] The temperature of the aforementioned high-pressure fluid is the survival removal method of the filter for exhaust air gas cleanup equipments according to claim 3 characterized by being set as 20 degrees C - 80 degrees C.

[Claim 5] The survival stripper of the filter for exhaust air gas cleanup equipments characterized by to have a fluid jet means to spray a high-pressure fluid on the end of the aforementioned filter, in the survival stripper which removes the combustion survival which is the filter from which the particulate which is held in casing prepared on the exhaust air passage of an internal combustion engine, and is discharged from an internal combustion engine is removed, and is deposited on this filter by the repeat of the combustion.

[Claim 6] The aforementioned filter is the survival stripper of the filter for exhaust air gas cleanup equipments according to claim 5 characterized by having pasted up those peripheral faces with adhesives using two or more honeycomb sintered compacts, and preparing the protection member for protecting a part for jointing of the aforementioned honeycomb sintered compacts between the aforementioned fluid jet means and a filter.

[Claim 7] It is the survival stripper of the filter for exhaust air gas cleanup equipments according to claim 5 or 6 which the aforementioned protection member is constituted including the wire rod prepared in the tubed fuselage section which fits into the end of the aforementioned filter, and opening formed in the fuselage section, and is characterized by arranging the aforementioned wire rod corresponding to a part for jointing.

[Claim 8] The filter for exhaust air gas cleanup equipments characterized by having the protection member which is held in casing prepared on the exhaust air passage of an internal combustion engine, carries out the uptake of the particulate discharged from an internal combustion engine, pastes up the peripheral faces of two or more honeycomb sintered compacts with adhesives in the filter for exhaust air gas cleanup equipments which carries out combustion removal, and protects a part for the jointing.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the survival removal method of removing the combustion survival which adhered to the filter by the repeat of the combustion especially, its stripper, and the filter for exhaust air gas cleanup equipments, about the filter which carries out combustion removal of the particulate contained in the exhaust gas of an internal combustion engine.

[0002]

[Description of the Prior Art] The regeneration system of this kind of exhaust air gas cleanup equipment is equipped with the filter for exhaust air gas cleanups in order to remove the particulate discharged from internal combustion engines, such as a diesel power plant. When these filters are used for a long time, the load of an engine becomes large by particulate deposition. Such a phenomenon is remarkable at diesel rolling stocks, such as a fork lift truck. For this reason, by energizing at the heater which accompanies a regeneration system, a filter is heated and combustion removal of the particulate is carried out. Consequently, a filter is reproduced.

[0003]

[Problem(s) to be Solved by the Invention] However, if a particulate is burned, the ash content etc. will deposit on a filter as a combustion survival. For this reason, when a combustion survival accumulates gradually in a filter, the amount of uptakes which a filter permits decreases, the time interval which results by reproduction becomes short, and the frequency of regeneration becomes high. Therefore, total quantity of electricity increases and efficiency is bad. Moreover, in the system of a continuous combustion, uptake time is less than reproduction time, and there is a possibility that reproduction may become impossible. Since exhaust gas pressure is always high also in vehicles, mpg becomes bad. Moreover, assistant ***** for combustion is no longer supplied fully, and reproduction of a filter is no longer performed enough.

[0004] this invention is made in view of the above-mentioned technical problem, and the purpose is in removing the combustion survival adhering to the filter nearly completely.

[0005]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, in invention according to claim 1 It is the filter which carries out the uptake of the particulate which is held in casing prepared on the exhaust air passage of an internal combustion engine, and is discharged from an internal combustion engine, and carries out combustion removal. In the survival removal method of removing the combustion survival deposited on this filter by the repeat of the combustion, a high-pressure fluid is sprayed on the end of the aforementioned filter, and let it be the summary to have washed the combustion survival adhering to the aforementioned filter.

[0006] In invention according to claim 2, in the survival removal method of the filter for exhaust air gas cleanup equipments according to claim 1, the aforementioned filter makes it the summary to have protected a part for jointing of the aforementioned honeycomb sintered compacts, when pasting up those peripheral faces with adhesives using two or more honeycomb sintered compacts and spraying a high-pressure fluid on the end of the aforementioned filter.

[0007] Let it be the summary for the aforementioned high-pressure fluid to be water in invention according to claim 3 in the survival removal method of the filter for exhaust air gas cleanup equipments according to claim 1 or 2.

[0008] In invention according to claim 4, the temperature of the aforementioned high-pressure fluid makes it the summary to be set as 20 degrees C - 80 degrees C in the survival removal method of the filter for exhaust air gas cleanup equipments according to claim 3.

[0009] It is the filter from which the particulate which is held in casing prepared on the exhaust air passage of an internal combustion engine in invention according to claim 5, and is discharged from an internal combustion engine is removed, and let it be the summary to have had a fluid jet means to spray a high-pressure fluid on the end of the

forementioned filter in the survival stripper which removes the combustion survival deposited on this filter by the repeat of the combustion.

[0010] In invention according to claim 6, the aforementioned filter makes it the summary to have pasted up those peripheral faces with adhesives using two or more honeycomb sintered compacts, and to have prepared the protection member for protecting a part for jointing of the aforementioned honeycomb sintered compacts between the aforementioned fluid jet means and the filter in the survival stripper of the filter for exhaust air gas cleanup equipments according to claim 5.

[0011] In the survival stripper of the filter for exhaust air gas cleanup equipments according to claim 5 or 6, the aforementioned protection member consists of invention according to claim 7 including the wire rod prepared in the tubed fuselage section which fits into the end of the aforementioned filter, and opening formed in the fuselage section, and let it be the summary to arrange the aforementioned wire rod corresponding to a part for jointing.

[0012] In invention according to claim 8, it holds in casing prepared on the exhaust air passage of an internal combustion engine, and the uptake of the particulate discharged from an internal combustion engine is carried out, and the peripheral faces of two or more honeycomb sintered compacts are pasted up with adhesives in the filter for exhaust air gas cleanup equipments which carries out combustion removal, and let it be the summary to have had the protection member which protects a part for the jointing.

[0013] Hereafter, "an operation" of this invention is explained. According to invention according to claim 1, washing removal of the combustion survival adhering to the filter is carried out by spraying a high-pressure fluid on the end of a filter. Therefore, in case combustion removal of the particulate discharged from an internal combustion engine is carried out and a filter is reproduced, it becomes possible to prevent mpg aggravation of the vehicles by combustion survivals, such as ash content generated, and a regeneration rate fall.

[0014] According to invention according to claim 2, since a part for jointing of honeycomb sintered compacts is protected, it becomes possible to bear a high-pressure fluid from the outside. Therefore, without honeycomb sintered compacts exfoliating, sufficient cleaning effect can be obtained and filter ability can be recovered certainly.

[0015] According to invention according to claim 3, while ending with a low cost as compared with the case where the solvent of an acid system is used since a high-pressure fluid is water for example, the workability of filter washing is good and will become friendly also to environment.

[0016] According to invention according to claim 4, since it is set as 20 degrees C - 80 degrees C, the water temperature of a high-pressure fluid can be melted in a high-pressure fluid, when components, such as calcium, are included in a combustion survival. Therefore, a cleaning effect can be heightened further.

[0017] According to invention according to claim 5, the combustion survival adhering to the filter is removed nearly completely by spraying a high-pressure fluid on the end of a filter from a fluid jet means. Therefore, in case combustion removal of the particulate discharged from an internal combustion engine is carried out and a filter is reproduced, to a filter, **** for reproduction is optimum dose (permission maximum), and can be reproduced efficiently.

[0018] According to invention given in claims 6 and 8, since a part for jointing of honeycomb sintered compacts is protected by the protection member, it becomes possible to bear a high-pressure fluid from the outside. Therefore, without honeycomb sintered compacts exfoliating, sufficient cleaning effect can be obtained and filter ability can be recovered certainly.

[0019] According to invention according to claim 7, a high-pressure fluid can be easily passed from the portion formed between the wire rods arranged corresponding to a part for jointing of honeycomb sintered compacts. Therefore, it becomes possible to wash a filter, without reducing most pressures of a high-pressure fluid.

[0020]

[Embodiments of the Invention] Hereafter, 1 operation form which materialized this invention is explained in detail based on a drawing. As shown in drawing 1, this exhaust air gas cleanup equipment 11 is equipment for purifying the exhaust gas discharged from the diesel power plant 12 as an internal combustion engine used for a fork lift truck etc. The diesel power plant 12 is equipped with two or more cylinders which are not illustrated. The tee 14 of the exhaust manifold 13 which consists of a metallic material is connected with each cylinder, respectively. Each tee 14 is connected to one manifold main part 15, respectively. Therefore, the exhaust gas discharged from each cylinder is concentrated on one place.

[0021] The 1st exhaust pipe 16 and the 2nd exhaust pipe 17 which consist of a metallic material are arranged in the downstream of an exhaust manifold 13. The upstream edge of the 1st exhaust pipe 16 is connected with the manifold main part 15. Between the 1st exhaust pipe 16 and the 2nd exhaust pipe 17, exhaust air gas cleanup equipment 11 is arranged. And the internal field of the 1st exhaust pipe 16, exhaust air gas cleanup equipment 11, and the 2nd exhaust pipe 17 is mutually open for free passage, and exhaust gas flows the inside of it.

[0022] This exhaust air gas cleanup equipment 11 consists of an inlet unit A, a filter unit B, and an outlet unit C. The upper edge of a filter unit B is connected with the downstream edge of the 1st exhaust pipe 16 through the inlet unit A. The down-stream edge of a filter unit B is connected with the upstream edge of the 2nd exhaust pipe 17 through the outlet unit C.

[0023] Each unit A-C is equipped with the casing 18a, 18b, and 18c which consists of a metallic material, respectively. Flanges 26a and 26b are formed in the boundary section of casing 18a of the inlet unit A, and casing 18b of a filter unit B. And the inlet unit A and the filter unit B are removable with the clip band which was prepared in each flanges 26a and 26b and which is not illustrated. Moreover, flanges 26c and 26d are formed in the boundary section of casing 18b of a filter unit B, and casing 18c of the outlet unit C. And the filter unit B and the outlet unit C are removable with the clip band which was prepared in each flanges 26c and 26d and which is not illustrated.

[0024] The filter 19 is held in casing 18b of a filter unit B. The heat insulator layer 20 is arranged between the peripheral face of a filter 19, and the inner skin of casing 18b. The heat insulator layer 20 is the mat-like object formed including the ceramic fiber. Moreover, in casing 18a of the inlet unit A, the electric heater 21 for heating a filter 19 is formed. By this electric heater 21, the particulate adhering to this filter 19 burns by heating a filter 19.

[0025] As shown in drawing 2 and drawing 3, since the filter 19 used in this operation gestalt is what removes a diesel particulate like the above, it is also called diesel particulate filter (DPF). The filter 19 used in this operation gestalt is unified combining two or more honeycomb sintered compacts F. The honeycomb sintered compact F located in the center of filter section is the square pole-like, and the dimension is 33mmx33mmx167mm. Around the square pole-like honeycomb sintered compact F, two or more variant honeycomb sintered compacts F which are not the square pole-like are arranged. Consequently, it has become pillar-like if a filter 19 is seen as a whole.

[0026] These honeycomb sintered compacts F are products made from a porosity silicon-carbide (SiC) sintered compact which are kinds of a ceramic sintered compact. As sintered compacts other than a silicon carbide, sintered compacts, such as a silicon nitride, sialon, an alumina, and a cordierite, can also be chosen. Two or more breakthroughs 22 which make the shape of a cross-section abbreviation square are regularly formed in the honeycomb sintered compact F along the direction of an axis. Each breakthrough 22 is mutually separated by the cell wall 23. Opening of each breakthrough 22 is closed with the closure object 24 (here porosity silicon-carbide sintered compact) at the one end-face 19a and 19b side, and has become checker-like as end-face 19a and the whole 19b. Consequently, the cell of a large number which carried out the cross-section square configuration is formed in the honeycomb sintered compact F. In upstream end-face 19a, opening of the thing of an abbreviation moiety is carried out among a large number cells, and opening of the remaining things is carried out in downstream end-face 19b.

[0027] As shown in drawing 2 and drawing 3, the peripheral faces have pasted up two or more honeycomb sintered compacts F with adhesives. in addition, the member shown in drawing 2 and drawing 3 -- the number "25" shows a part for the jointing Adhesives bear the duty which softens that the honeycomb sintered compact F expands thermally. That is, with adhesives, the crack by thermal stress arises in the filter 19 made from a silicon carbide, and ** can be prevented now. As adhesives, the ceramic heatproof adhesives with which the ceramic fiber was distributed are used. In adhesives, it is good that silicon-carbide powder is distributed in addition to a ceramic fiber.

[0028] Exhaust gas is supplied to a filter 19 from the upstream end-face 19a side. The exhaust gas supplied through the 1st exhaust pipe 16 flows first in the cell which carries out opening in upstream end-face 19a. Subsequently, this exhaust gas passes a cell wall 23, and reaches the interior of the cell which adjoins it, i.e., the cell which carries out opening in downstream end-face 19b. And exhaust gas flows out of downstream end-face 19b of a filter 19 through opening of this cell. However, the soot contained in exhaust gas will not be able to pass a cell wall 23, but a trap will be carried out there. Consequently, the purified exhaust gas is discharged from downstream end-face 19b of a filter 19. After the purified exhaust gas passes the 2nd exhaust pipe 17 further, finally it is emitted into the atmosphere. Then, if a filter 19 is heated by the electric heater 21 and it reaches to a soot ignition temperature, by sending a combustion air, soot will burn and a filter 19 will be reproduced.

[0029] Next, after burning, the survival stripper which removes the combustion survival which remained in the filter 19 is explained. As shown in drawing 4 and drawing 5, the survival stripper 31 is equipped with the pedestal 32 for supporting a filter unit B. This pedestal 32 consists of the four legs 33 and **** 34 which makes the shape of upper edge ***** of them. And the aforementioned filter unit B is stood on **** 34.

[0030] The protection mask 36 as a protection member is formed in the upper-limit section of a filter unit B. The protection mask 36 is equipped with the cylinder-like fuselage section 37, and the bore of this fuselage section 37 is almost the same as the bore of a filter 19. Annular flange 37c protrudes on the periphery soffit edge of the fuselage section 37, and contact support of this flange 37c is carried out at flange 26c of casing 18b.

[0031] The bolting band 27 which makes the shape of a cross-section channel is formed in the boundary section of the protection mask 36 and a filter unit B. Moreover, the part is separated, and if the bolting band 27 is seen as a whole, it

is mostly formed in annular. And the bolting band 27 pinches both aforementioned flange 37c and 26c along with the hoop direction. The pieces 28a and 28b of attachment bind tight in the ends of the bolting band 27, and it protrudes on them along the direction of a path of a band 27. The screw 29 is screwed in each pieces 28a and 28b of attachment possible [an attitude]. And the screw 29 enables it to bind the bolting band 27 tight free.

[0032] As shown in drawing 4 - drawing 6 , annular stop section 37a protrudes on the inner circumference upper-limit edge of the fuselage section 37. Regular intervals are set to stop section 37a, and the upper-limit section of two or more compression springs 38 is hung. Inside the fuselage section 37, the mesh 39 made from stainless steel is arranged. This mesh 39 is being fixed to the soffit of the aforementioned compression spring 38. And a mesh 39 is pressed by the elastic force of a compression spring 38 in the upper-limit side of the honeycomb sintered compact F.

[0033] A mesh 39 consists of ring frame 39a and two or more wire rod 39b arranged in the shape of a grid inside the ring frame 39a. If the interval of each wire rod 39b is said concretely, it is the same 33mm pitch as the dimension of the honeycomb sintered compact F. Therefore, each wire rod 39b can be arranged in a part for the jointing 25 of each honeycomb sintered compact F, and a corresponding position. For this reason, each wire rod 39b has achieved the duty which protects a part for this jointing 25 by covering the upper-limit section for jointing 25.

[0034] As shown in drawing 4 , the nozzle 43 as a fluid jet means is formed in the upper part position of the protection mask 36. This nozzle 43 is arranged in the center of a simultaneously of the protection mask 36. And the wash water as a high-pressure fluid is sprayed by high pressure towards the end face of a filter 19 from the nose of cam of a nozzle 43. The position of a nozzle 43 can be adjusted now so that the wash water from a nozzle 43 may be sprayed on the whole upper-limit side of a filter 19 uniformly and perpendicularly.

[0035] In this operation gestalt, the temperature of a wash water is 20 degrees C - 80 degrees C, and the water pressure serves as 3-15MPa. It is much more more desirable to set the pressure of a wash water to 9-12MPa. This is because it becomes impossible to fully wash a filter 19 when too low [if water pressure is too high, the uptake capacity of the honeycomb sintered compact F will decline, and] on the contrary. In addition, the one where the pressure of a wash water is higher is a short time, and it becomes possible to remove a combustion survival.

[0036] Next, how to remove the combustion survival deposited on the filter 19 by particulate combustion is explained using the survival stripper 31 constituted as mentioned above. In addition, in this operation gestalt, a combustion survival means a calcium sulfate, a zinc sulfate, iron, etc. There are also things, such as a silica and a cerium, depending on the environment where a fork lift truck is used besides this.

[0037] A filter unit B is removed from exhaust air gas cleanup equipment 11, and after the attachment screw which does not illustrate the filter unit B has stood on **** 34, it fixes. At this time, it is downstream end-face 19b that you make it located in the filter 19 bottom. Then, the protection mask 36 is put on the upper part of a filter unit B. And in order to make each wire rod 39b of a mesh 39 in agreement with a part for each jointing 25 of a filter 19, alignment of a filter unit B and the protection mask 36 is carried out.

[0038] Then, when both the flanges 37c and 26c are equipped with the bolting band 27 and a screw 29 is bolted, the protection mask 36 and a filter unit B are fixed. In this state, the inferior surface of tongue of each wire rod 39b is pressed by the elastic force of a compression spring 38 at a part for the jointing 25 of a filter 19.

[0039] If a high-pressure wash water blows off from a nozzle 43, the wash water will pass upper-limit opening 37b of the fuselage section 37, and a mesh 39, and will reach the upper-limit side of a filter 19. And the combustion survival adhering to each breakthrough 22 in each honeycomb sintered compact F is removed nearly completely by the pressure of a wash water. A part for the jointing 25 which is in the interface of each honeycomb sintered compact F during washing is protected by each wire rod 39b. Therefore, even if it blows off a wash water by high pressure extremely, adhesives in the upper-limit section for jointing 25 of a filter 19 called 10MPa separate, and do not fall. Moreover, since wire rod 39b of a mesh 39 is firmly pressed by the elastic force of a compression spring 38, it does not shake under the influence of water pressure etc. The drainage containing a combustion survival flows in the waste-water-treatment section which does not pass and illustrate **** 34.

[0040] The result which incidentally compared the pressure-loss property of the new filter 19 and the filter 19 which performed high-pressure washing is shown in the graph of drawing 7 . Here, a "pressure loss" means what lengthened the pressure value of a downstream from the pressure value of filter 19 upstream held in casing 18b. Receiving resistance, in case exhaust gas passes a filter 19 is the greatest factor which brings about a pressure loss. Therefore, a combustion survival has big influence on the pressure-loss property of a filter 19.

[0041] In the graph of drawing 7 , the time (h) of a filter 19 is shown and a vertical axis shows a pressure loss (KPa). A solid line shows the new filter 19, a two-dot chain line shows the filter 19 after washing, and an alternate long and short dash line shows the filter 19 before washing. In addition, the pressure of a wash water was set as 10MPa(s), and washing time was carried out to washing in this case for about 10 minutes. Consequently, the combustion survival which adhered to the filter 19 by high-pressure washing was completely removable even to the same grade as the new

filter 19. Therefore, the filter 19 which washed was able to acquire the equivalent pressure-loss property to the new filter 19. Therefore, the combustion survival accumulated by the repeat of regeneration and filter ability also fully recovered the filter 19 with which the operating time became short by washing processing.

[0042] Therefore, according to this operation gestalt, the following effects can be acquired.

(1) The nozzle 43 is formed above the filter 19. And the wash water as a high-pressure fluid (washing medium) is sprayed on the end of a filter 19 from a nozzle 43. Therefore, combustion survivals, such as ashes which adhered to the filter 19 by particulate combustion, can be removed nearly completely. Therefore, mpg aggravation of vehicles, decline in an electrical efficiency, and decline in the regeneration rate of a filter 19 can be prevented. Since a combustion survival can be removed nearly completely with it, assistant ***** for particulate combustion can fully be supplied in a filter unit B. Therefore, reproduction of a filter 19 can be ensured.

[0043] (2) By spraying a wash water on a filter 19, not only combustion survivals, such as ash content, but when soot accumulates more than a permissible dose in a filter 19, soot can be removed efficiently.

[0044] (3) Between the nozzle 43 and the filter 19, the protection mask 36 for protecting a part for the jointing 25 of honeycomb sintered-compact F is formed. Therefore, the wash water which blows off from a nozzle 43 does not hit [the amount of / 25 / jointing] directly. Therefore, it can prevent, and it fully bears that the adhesives in the upper-limit section for jointing 25 of a filter 19 separate and fall, and the thing of it can be carried out to a high-pressure wash water. In other words, cleaning effect sufficient also about the combustion survival which was difficult to be able to make the pressure of a wash water high (10 or more MPas), and to wash it until now can be obtained. Therefore, sufficient filter ability recovery is attained also with the exhaust air gas cleanup equipment (muffler) 11 with which the combustion survival accumulated and the operating time became short. In addition, even if it performs processing according a filter 19 to a high-pressure wash water many times, honeycomb sintered-compact F does not exfoliate.

[0045] (4) The protection mask 36 is constituted including the tubed fuselage section 37 which fits into the end of a filter 19, and two or more wire rod 39b prepared inside the fuselage section 37. And each wire rod 39b is arranged along with a part for jointing 25. Thereby, it passes from the crevice between each wire rod 39b, without a wash water carrying out the failure of pressure. Therefore, a high detergency can be demonstrated. With it, it can fully bear to a high-pressure wash water in spite of easy composition.

[0046] (5) Each wire rod 39b is suppressed by the filter 19 by the elastic force of a compression spring 38. Therefore, even if it blows off a wash water by high pressure extremely, since the elastic force of a compression spring 38 is fixed firmly, a filter 19 can prevent shakiness of wire rod 39b under washing. Therefore, a combustion survival is uniformly [without nonuniformity] removable.

[0047] (6) Since water is used as a penetrant remover, combustion survivals, such as ashes adhering to the filter 19, are removable by the low cost. The waste fluid processing after washing with it compared with the case where the solvent of for example, an acid system etc. is used for a penetrant remover will become eco-friendly.

[0048] (7) Since a wash water is warm water, even when components, such as calcium, are included in a combustion survival, it can be melted easily in a wash water. Therefore, in spite of using the eco-friendly washing medium, a cleaning effect can be heightened further.

[0049] In addition, you may change the operation gestalt of this invention as follows.

- With the aforementioned operation gestalt, wire rod 39b was suppressed in the filter 19 by the compression spring 38. Besides this, you may suppress wire rod 39b in a filter 19, the elastic bodies, for example, the rubber material etc., other than compression-spring 38 etc.

[0050] - With the aforementioned operation gestalt, the wash water was used as a high-pressure fluid. Besides this, you may use the liquid of an acid system (fluorine oxide) for washing. Furthermore, a high-pressure fluid may be changed into gases, such as not a liquid but air, and the gas may be sprayed on a filter 19 by high pressure.

[0051] - In order to make the cleaning effect of a filter 19 still higher, you may carry out equal arrangement of two or more nozzles 43. Since the blasting range of the wash water which blows off from each nozzle 43 can be narrowed when two or more nozzles 43 are formed, a filter 19 can be made to approach as much as possible.

[0052] - With the aforementioned operation form, 20 degrees C - 80 degrees C warm water was used for the temperature of a wash water. Besides this, you may set a wash water as temperature lower than 20 degrees C or temperature higher than 80 degrees C.

[0053] Next, the technical thought grasped according to the operation form mentioned above is enumerated below with the effect besides the technical thought indicated by the claim.

(1) It is the survival removal method of the filter for exhaust air gas cleanup equipments characterized by the pressure of the aforementioned high-pressure fluid being 10 or more MPas in either among claims 1-4. According to this method, sufficient detergency can be demonstrated.

[0054] (2) It is the survival stripper of the filter for exhaust air gas cleanup equipments characterized by for the

aforementioned fluid jet means keeping a predetermined distance from the end side of a filter in either of the claims 5-7, and being arranged.

[0055] (3) It is the survival stripper of the filter for exhaust air gas cleanup equipments characterized by the width of face of the aforementioned wire rod being larger than the width of face for jointing of the aforementioned honeycomb sintered compacts in claims 5-7 or the above (2). If it is made this composition, protection for jointing between honeycomb sintered compacts can be aimed at certainly.

[0056] (4) It is the survival stripper of the filter for exhaust air gas cleanup equipments characterized by the aforementioned wire rod being stainless steel in claims 5-7, the above (2), or (3).

[0057] (5) It is the survival stripper of the filter for exhaust air gas cleanup equipments characterized by the aforementioned high-pressure fluid being an acid system in either of the claims 1, 2, 5-7.

(6) It is the survival stripper of the filter for exhaust air gas cleanup equipments characterized by the aforementioned high-pressure fluid being a fluorine oxide in the above (5).

[0058]

[Effect of the Invention] As explained in full detail above, according to invention given in claims 1 and 5, the combustion survival adhering to the filter can be removed nearly completely.

[0059] According to invention given in claims 2, 6, and 8, without honeycomb sintered compacts exfoliating, sufficient cleaning effect can be obtained and filter ability can be recovered certainly.

[0060] According to invention according to claim 3, the survival which deposits a particulate on a filter by the repeat of burning can be removed nearly completely by the low cost.

[0061] According to invention according to claim 4, even when components, such as calcium, are included in a combustion survival, it can melt easily in a wash water. Therefore, a cleaning effect can be heightened further.

[0062] According to invention according to claim 7, a filter can be washed, without reducing most pressures of a high-pressure fluid.

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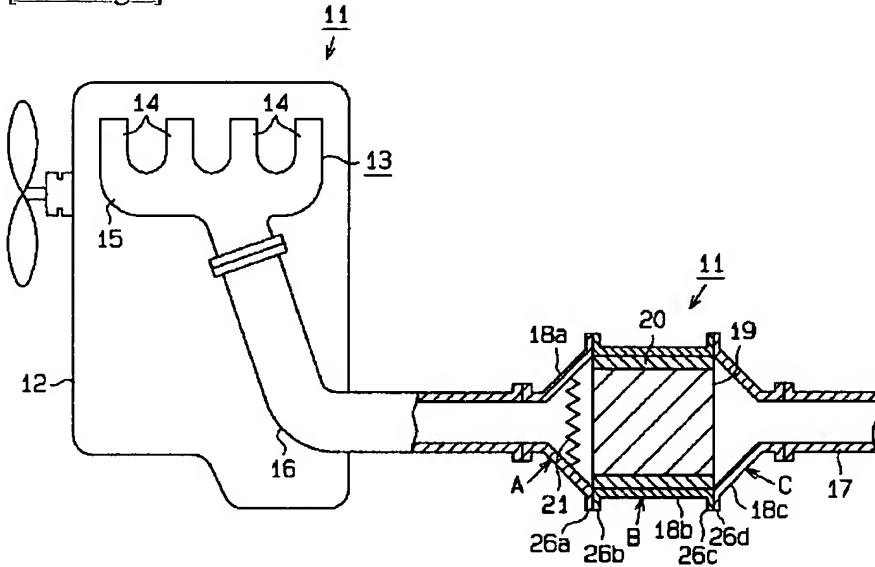
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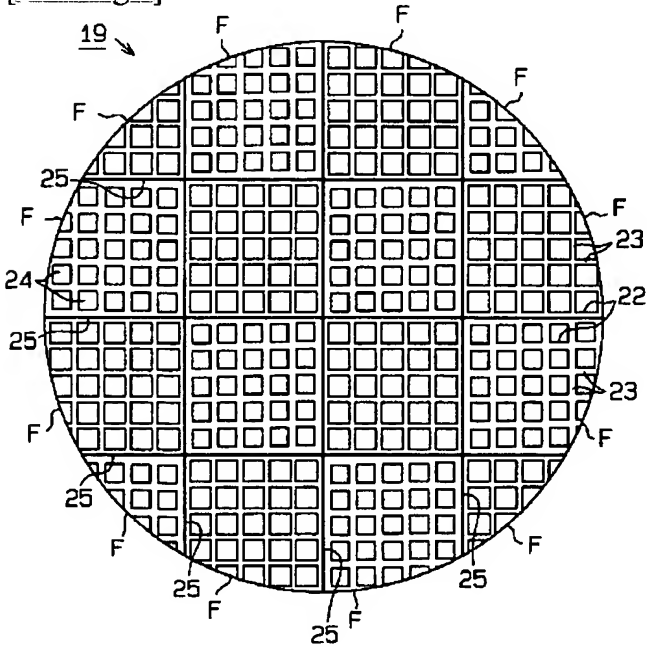
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DRAWINGS

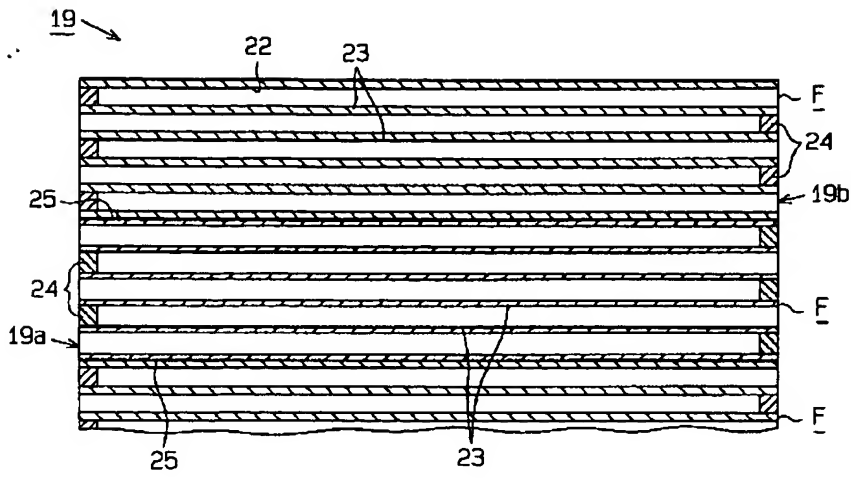
[Drawing 1]



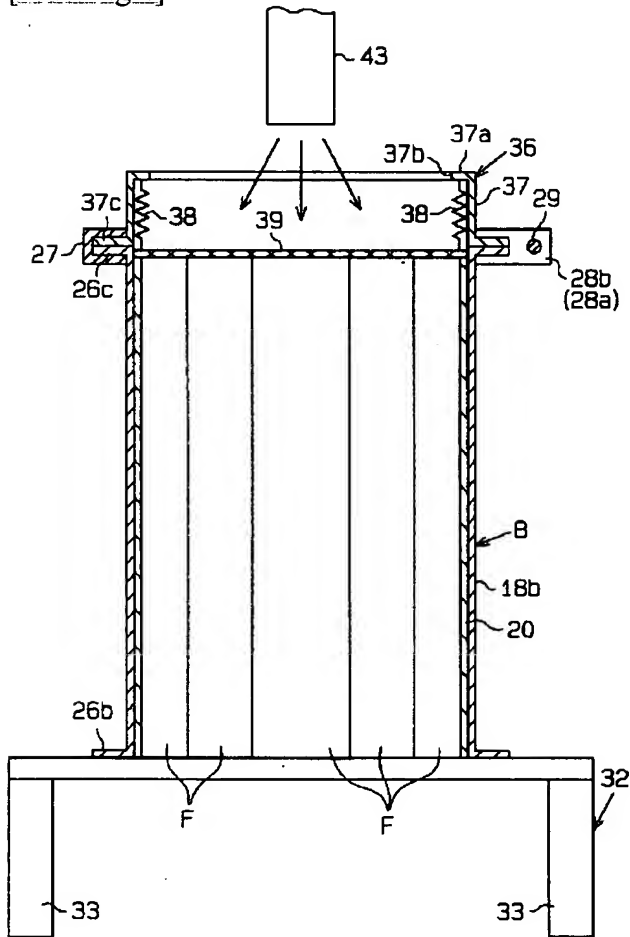
[Drawing 2]



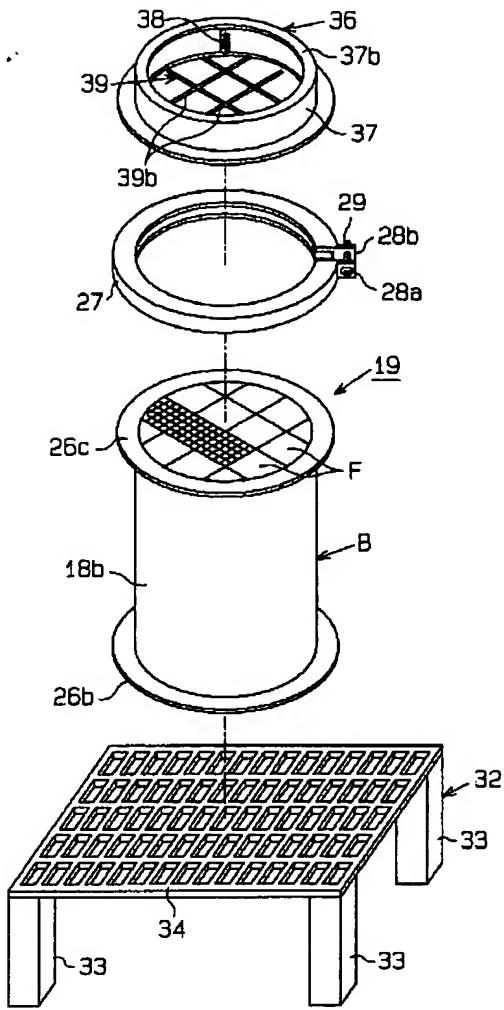
[Drawing 3]



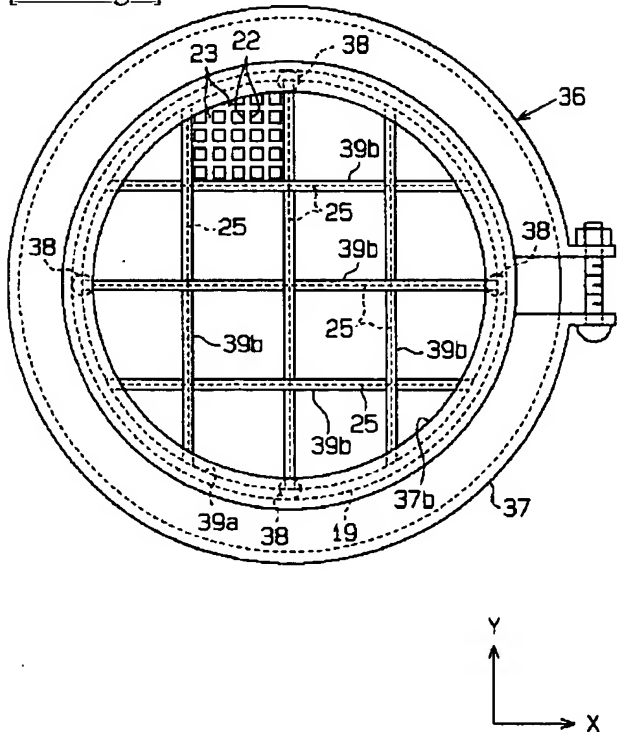
[Drawing 4]



[Drawing 5]

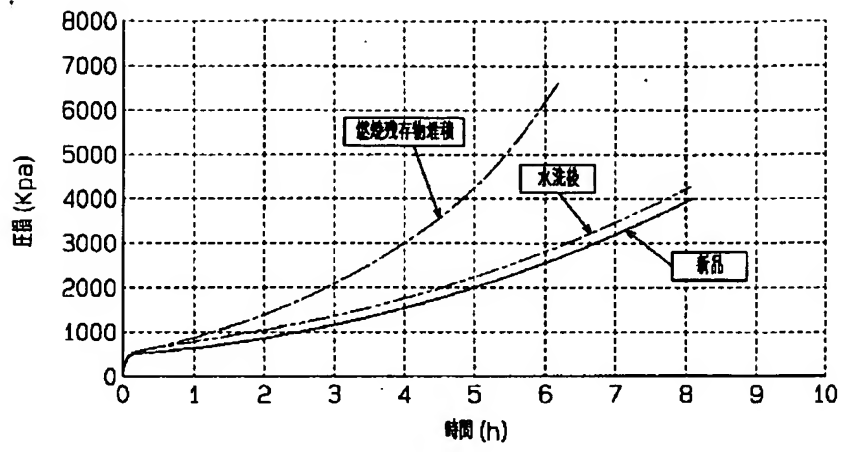


[Drawing 6]



[Drawing 7]

圧損比較グラフ



[Translation done.]